

### **REMARKS**

The amendment to the specification correct inadvertent typographical errors. Claims 1-15 and 22-27 have been cancelled. Claims 16, 19-21, and 28-31 have been amended. The amendment to claim 16 is supported by the specification, at least at page 10, lines 8-9 and 14-16; at page 10, lines 22-23 and line 28 - page 11, line 2; at page 11, lines 5-6 and 11-14; and at page 11, lines 19-20 and 25-28. The amendments to claims 19 and 29 correct inadvertent typographical errors. The amendments to claims 20, 21, 30 and 31 further clarify the language of the claims. New claims 32-38 have been added, and are supported by the specification at least at page 9, lines 17-19; page 10, lines 16-17; page 11, lines 1-2; page 15, lines 1-4 and 25-27; page 16, lines 10-12; and Figures 6-8. No new matter has been added.

Applicants affirm the election of Group II, claims 11-12, 16-21 and 28-31, as listed in the present Office Action. Claims 16-21 and 28-38 are present in the application.

Applicants would like to thank Examiner Gray for indicating that original claims 20, 21 and 28-31 are free of the prior art.

### **INTERVIEW SUMMARY**

Applicants would like to thank Examiner Gray for the helpful discussion with Applicants' representatives on July 26, 2006. During this discussion, the references of record were reviewed with respect to the claims, and the present amendment to claim 16 was discussed.

### **REQUEST FOR RECONSIDERATION**

Considerable research is being directed at effective and economical water treatment strategies that minimize the production of undesirable disinfection by-products. Advanced oxidation processes (AOPs) are alternative processes which destroy organic compounds in environmental samples and turn them into nontoxic forms, such as carbon dioxide and water. Photocatalysis is an AOP in

which photoactive semiconductor catalysts are immersed in an oxygenated aqueous solution and illuminated with UV or visible radiation so that reactive oxygen species are produced, causing the oxidation of organic compounds in the water. Although ceramic semiconductors such as titanium oxide and doped titanium oxide are photoactive, it has been difficult to produce the porous, highly crystalline forms of these ceramics that are required for photocatalysis.

The claimed invention includes a ceramic coated fiber including a fiber and a ceramic, coated on the fiber. In one embodiment, the ceramic may have a composition different from that of the fiber, have a BET surface area of at least  $60 \text{ m}^2/\text{g}$ , and include crystalline ceramic. In another embodiment, the ceramic may include at least one of  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$  and  $\text{MgO}$ , and have a BET surface area of at least  $50 \text{ m}^2/\text{g}$ . Applicants have discovered that these ceramic coated fibers may be made by using fibers coated with activated carbon as templates to form ceramic on the fibers, despite the instability of activated carbon at high temperatures.

### **Rejection under 35 U.S.C. § 112**

The rejection of claims 16-19, 28 and 29 under 35 U.S.C. § 112, second paragraph is respectfully traversed. The phrase “the ceramic has a BET surface area ...” refers to the ceramic that is coated on the fiber, and not to the overall ceramic coated fiber.

The rejection of claims 20, 21, 30 and 31 under 35 U.S.C. § 112, second paragraph have been obviated by appropriate amendment. Claims 20 and 30 have been amended to recite that the ceramic accounts for 10 to 90% by weight of the ceramic coated fiber. Claims 21 and 31 have been amended to recite that the ceramic further comprises silver and/or palladium.

In view of the remarks and amendments, claims 16-21 and 28-31 are not indefinite. Applicants respectfully request that these rejections be withdrawn.

**Rejection under 35 U.S.C. § 102**

The rejection of claims 11 and 12 as anticipated under 35 U.S.C. § 102(b) has been obviated by appropriate amendment. Claims 11 and 12 have been cancelled.

The rejection of claims 16-19 as anticipated under 35 U.S.C. § 102(b) by Nam (Nam, K., et al., "Preparation and characterization of TiO<sub>2</sub> fiber and its photocatalytic properties", Paper # 291) and by Kim (Kim, H.J., et al., "Preparation of TiO<sub>2</sub> Fiber and its Photocatalytic Properties", Materials Science Forum, vol. 439, pp. 271-276 (2003)) has been obviated by appropriate amendment. Nam and Kim disclose fibers that are made of a single ceramic composition. In contrast, amended claim 16 recites a ceramic coated fiber where the ceramic coating has a composition different from that of the fiber.

Nam discloses titanium oxide (TiO<sub>2</sub>) fibers for photocatalysis (Nam; p.2, lines 9-11). The preparation of the TiO<sub>2</sub> fibers is disclosed at page 2, section 1 ("Catalyst Preparation") of Nam. An activated carbon fiber is impregnated with a titanium precursor, and the impregnated fiber is dried and then calcined at high temperature in air (Nam; p.2, lines 14-23). The activated carbon material and any impurities are removed in the calcination process (Nam; p.2, lines 23-24). When Ti(SO<sub>4</sub>)<sub>2</sub> is used as the titanium precursor, TiO<sub>2</sub> is formed directly, without forming another material such as titanyl sulfate as an intermediate (Nam; p.6, lines 4-14). The material that remains is TiO<sub>2</sub>, with small amounts of impurities such as carbon and sulfur (Nam; p.7, section 5, first paragraph). Thus, the fibers in Nam are made of a single material, TiO<sub>2</sub>.

Kim discloses a similar method for preparing TiO<sub>2</sub> fibers. In this method, an activated carbon fiber is impregnated with a titanium precursor, and the impregnated fiber is dried and then calcined at high temperature in air. The activated carbon material and any impurities are removed in the calcination process (Kim; p.271, next-to-last line to p.272, end of 1<sup>st</sup> paragraph). The material that remains is high surface area TiO<sub>2</sub>, with sulfate ions on the fiber

surface (Kim; p.275, last paragraph). Thus, the fibers in Kim are made of a single material, TiO<sub>2</sub>.

As amended, independent claim 16 recites a fiber and a ceramic coating on the fiber, where the ceramic coating has a composition different from the fiber on which it is coated. Neither Nam nor Kim disclose or suggest a fiber and a ceramic coating having different compositions. The references disclose only fibers that contain a single material throughout the fiber. Applicants submit that claims 16-19 are neither anticipated by, nor obvious over, the applied references. Withdrawal of the rejections is respectfully requested.

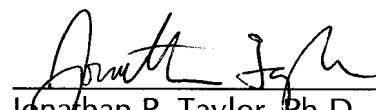
### CONCLUSION

All of the grounds raised in the present Office Action for rejecting the application are believed to be overcome or rendered moot based on the remarks above. Thus, it is respectfully submitted that all of the presently presented claims are in form for allowance, and such action is requested. Should the Examiner feel a discussion would expedite the prosecution of this application, the Examiner is kindly invited to contact the undersigned at (312) 876-1400.

Respectfully submitted,

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Evan Law Group  
566 West Adams St., Suite 350  
Chicago, IL 60661  
(312) 876-1400

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Jonathan P. Taylor, Ph.D.  
Registration No. 48,338